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## Mössbauer Studies on Nanoparticles of Zinc Substituted Magnesium Ferrite

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**Abstract** — Nanoparticles of zinc substituted Mg-ferrite ( $\text{Mg}_{(1-x)}\text{Zn}_x\text{Fe}_2\text{O}_4$ ,  $x = 0.70$  and  $0.85$ ) with well-developed spinel phases have been prepared by standard co-precipitation method. Single-phase ferrite with a spinel structure began to form at a relatively lower temperature ( $\sim 200$  °C). X-ray diffractometry and  $^{57}\text{Fe}$  Mössbauer effect measurements were carried out to characterize Mg-Zn-ferrite nanoparticles. The particle sizes obtained from Sherrer equation lie in the range, 6.4 nm to 25.6 nm. Mössbauer measurements at room temperature and down to 20 K clearly indicate the presence of superparamagnetic particles in all the samples. Superparamagnetic relaxation was observed at room temperature even for larger particle size of the samples and this may be due to the weakening of A-B exchange interaction in ferrite lattice due to replacement of  $\text{Fe}^{3+}$  ions in tetrahedral sites by  $\text{Zn}^{2+}$  ions.